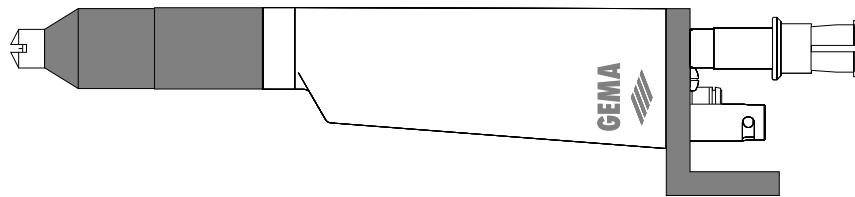


Operating Instructions and Spare Parts List

# PG 2-A Automatic Powder Gun (and PG 2-AX Automatic Powder Gun for Quick Colour Changes)





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## **Safety rules for electrostatic powder coating operations**

1. This equipment can be dangerous when not operated according to the following operating instructions.
2. In addition, the equipment must be set up and operated according to the latest local standards.
3. The operating instructions of the powder recovery plant must also be observed.
4. All electrostatic conductive parts which are within 5 metres of the coating area, especially the workpieces, must be grounded.
5. The floor of the coating area must be electrostatically conductive. Normal concrete is generally conductive.
6. The operating personnel must wear electrostatically conductive footwear, i.e. leather soles.
7. It is important that a good metal-to-metal contact exists between the control unit(s), the gun(s), coating booth, and the workpiece conveyor system.
8. The electrical cables and powder feed hoses to the gun(s) must be laid out so that they are protected from mechanical damage.
9. The powder coating equipment should only be switched on after the coating booth is in operation. If the booth breaks down then the powder coating equipment must also switch off.
10. The ground leakage resistance of the workpiece contact point can be a maximum of 1 M $\Omega$ . The design of the workpiece suspension and hooks must ensure that the workpieces remain grounded.  
N.B :  
Because the workpieces are grounded through metal hooks, it is important that the hooks are cleaned regularly, in order to prevent an insulating layer of melted coating powder from building up.
11. Check the grounding of all electrostatic conductive parts at least once a week.
12. When cleaning the gun or changing nozzles the control module must be switched off.



## PG 2-A Automatic Powder Gun

The extremely lightweight PG 2-A Automatic powder gun with an integrated high-voltage generator has a very high penetration power and a high, constant transfer efficiency because of its patented air-cleaned central electrode. The gun can be dismantled, making it easy to maintain and repair.

**⚠ IMPORTANT**

**There is a (downward) compatibility with earlier automatic powder gun cable plugs (fitting into the gun). For such cases an adapter is now available and should be ordered with the gun. These adapters are not suitable for PG 2-AX guns See Spare Parts List, pages 25 and 27.**

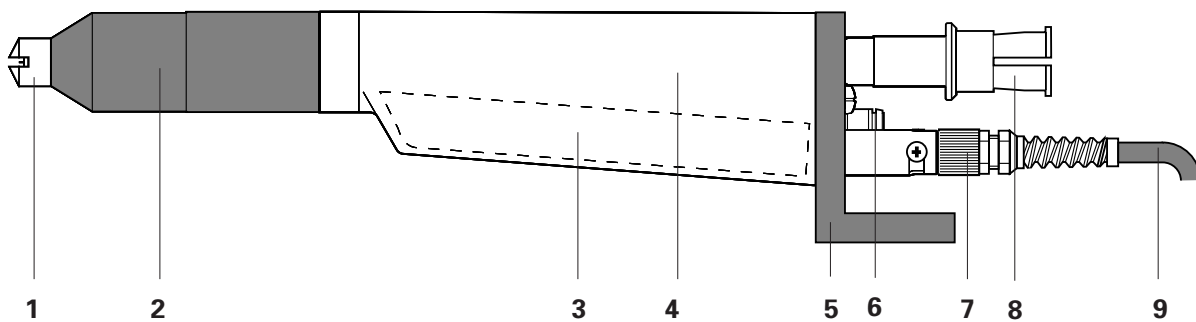
## Technical data of the PG 2-A and PG 2-AX Automatic Powder Guns

Rated input voltage:	10 V eff.
Frequency:	17 kHz.
Rated output voltage:	98 kV.
Polarity:	Negative (Positive - Option).
Maximum output current:	100 $\mu$ A.
Flash protection:	Type A - according to EN 50177*

\*Type A : "Systems complying with EN 50050:1986 with a discharge energy of 5 mJ."  
"In these systems there is no danger of either electric shock or incendive energy"

Connection : The PG 2-A(X) should only be connected to PGC 1, PGC 2, PGC 3, OptiTronic or RGC-HV Control units

## PG 2-A Automatic powder gun - Overview



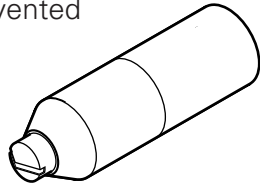
- |                      |  |
|----------------------|--|
| 1. Atomizing system. | 6. Rinsing air connection.             |
| 2. Threaded sleeve.  | 7. Gun cable connection.               |
| 3. H-V cascade.      | 8. Powder hose connection/Powder tube. |
| 4. Shaft.            | 9. Gun cable.                          |
| 5. Gun support.      |  |

Figure 1

The PG 2-A Automatic powder gun can be equipped with different nozzles and deflectors. See the "System Overview" sheet:

**40 mm nozzles**

Flat jet nozzle with vented centre electrode



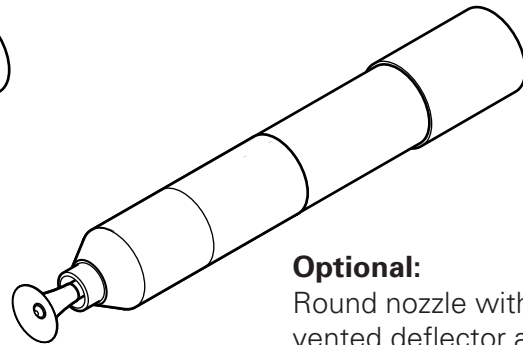
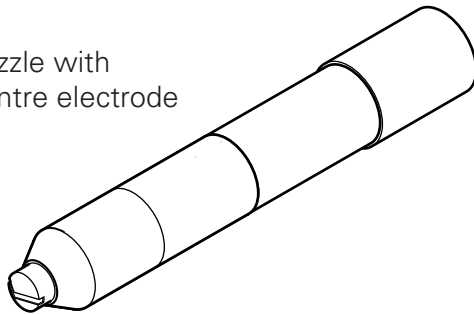
**Optional:**  
Round nozzle with vented deflector and vented centre electrode

**150 mm nozzles**

These nozzles should not be used with the SuperCorona attachment (Ineffective).

**Optional:**

Flat jet nozzle with vented centre electrode



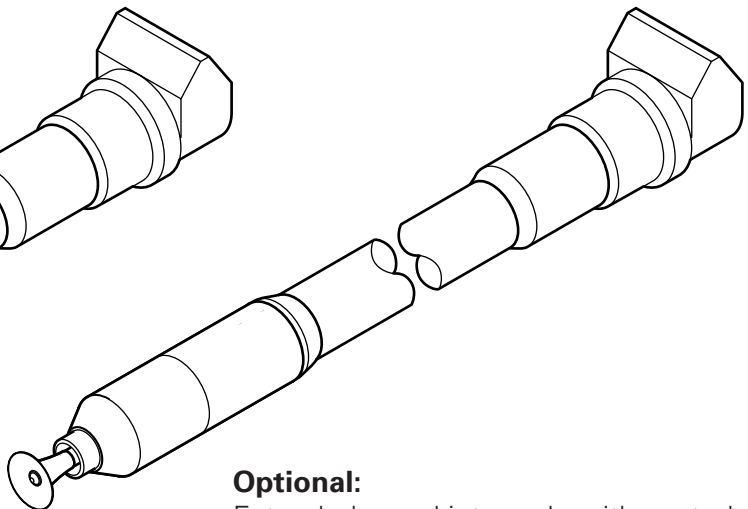
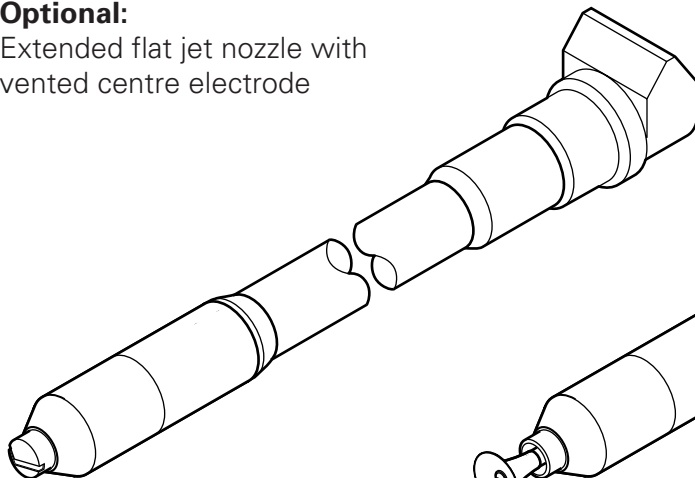
**Optional:**  
Round nozzle with vented deflector and vented centre electrode

**300 mm nozzles**

These nozzles should not be used with the SuperCorona attachment (Ineffective).

**Optional:**

Extended flat jet nozzle with vented centre electrode



**Optional:**  
Extended round jet nozzle with vented deflector and centre electrode

Figure 2

## Functional description

### High-Voltage generation

The voltage generator module (control module) of the PGC or OptiTronic control module supplies high-frequency low-voltage of approximately 10 Veff. This voltage is fed through the gun cable (c) and the gun connector (b) to the high-voltage cascade (a).

In the cascade (a) this low voltage is stepped up (e). This primary high-voltage is subsequently rectified and multiplied in several stages in the cascade (d) until the required high-voltage is attained.

The high-voltage is then fed from the spray nozzle to the electrode (f). See also Figs 5 and 6.

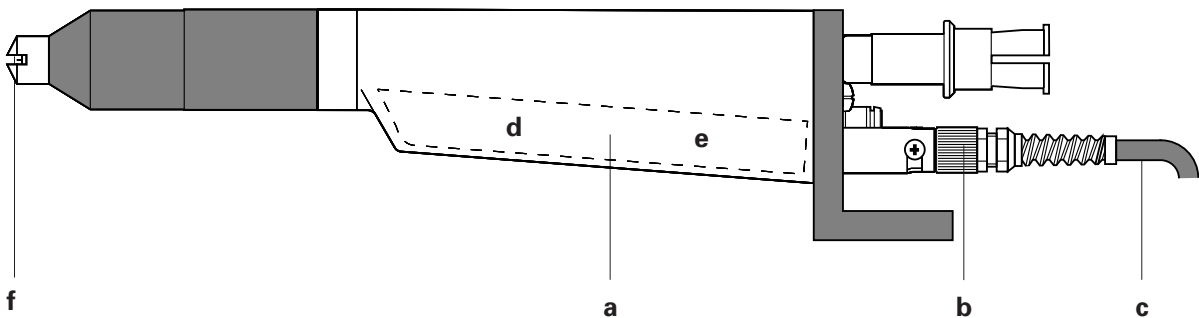


Figure 3

### Circuitry

The PG 2-A is controlled and switched on by the PGC or OptiTronic control module. The control module switches the low-voltage, the powder feed, and the gun air (rinsing air) on.

### Powder flow and rinsing air

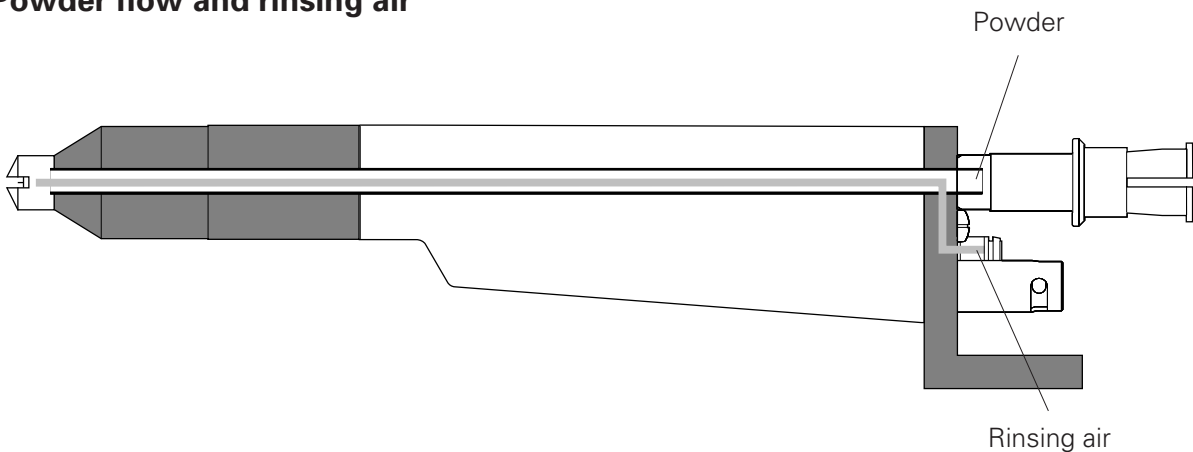


Figure 4

Additional air, functioning as rinsing air, is connected to the connection point **1.4 (8 - Fig. 7, page 6)**, at the rear of the PGC control module. The rinsing air tube and the powder tube run side by side in the shaft, not one inside the other, as may appear in Figure 4.

The function of the nozzles are described in the applicable sections (see page 5).

**Flat jet nozzle with vented centre electrode**

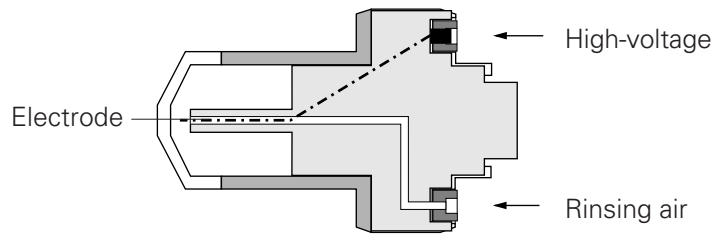


Figure 5

The flat jet nozzle atomizes and electrically charges the powder. The slotted opening shapes the powder cloud to form an oval spray pattern.

The powder is charged by the central electrode. The high-voltage, generated inside the gun, is fed via the black contact ring of the nozzle holder to the centre electrode.

In order to prevent powder from sintering (building up) on the electrode, the latter is cleaned by compressed air during the spraying process. For this purpose the rinsing air is fed, via the small hole in the black contact ring in the nozzle holder, into the hole in the electrode holder.

**Round nozzle with vented deflector and vented centre electrode**

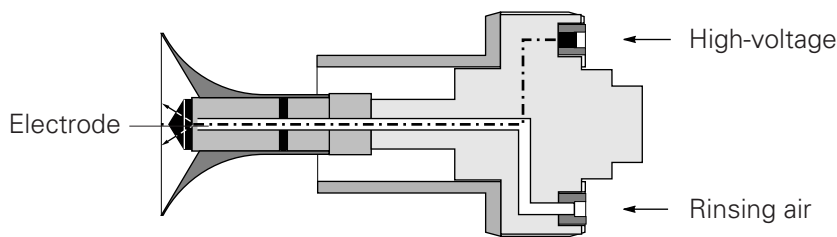


Figure 6

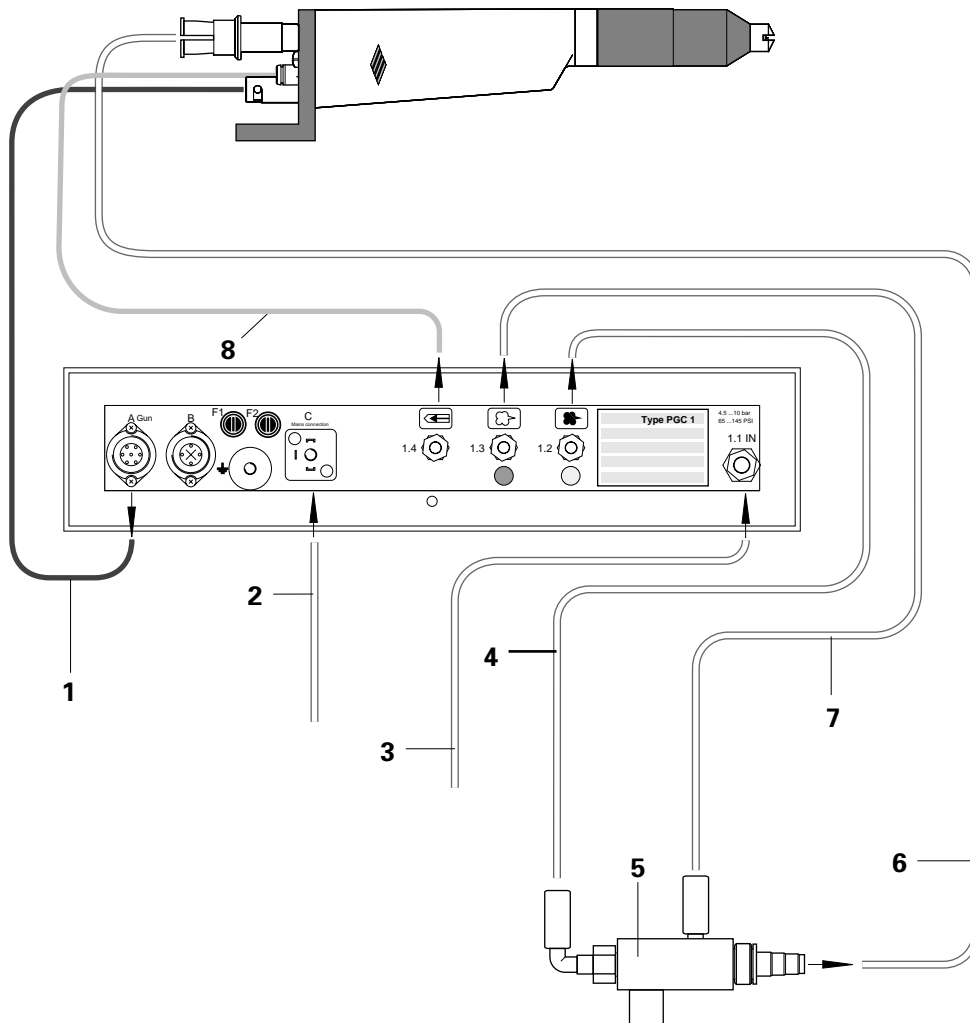
The deflector plate is used for shaping the powder jet emerging from the gun to form a powder cloud. The powder is charged by the centre electrode. The high-voltage generated inside the gun is conducted via the black contact ring of the nozzle holder to the centre electrode.

Powder can build up on the deflector plate, which has to be rinsed with air. For this purpose the rinsing air is fed via the small hole in the black contact ring in the nozzle holder, then into the hole in the electrode holder and deflected in such a way that it blows across the inside cone of the deflector plate. The intensity of the rinsing air is dependent on the powder and its sintering ability.

## Preparatory steps for initial start-up.

### a) Connecting the PG 2-A Automatic powder gun

1. Connect the cable (1) with the 7-pin connector to the socket labelled "A Gun" at the rear of the PGC control module (See Figure 7. below).
2. Connect the hose for rinsing air (8) to rinsing air outlet 1.4 and to the gun.
3. Connect the powder hose (6) to the gun and to the injector (5).



- |   |   |
|---|---|
| 1. Gun cable (output - <b>A Gun</b> ).            | 5. PI-V injector.                                 |
| 2. Mains power input cable (input - <b>C</b> ).   | 6. Powder hose.                                   |
| 3. Internal air input hose (input - <b>1.1</b> ). | 7. Supplementary air hose (output - <b>1.3</b> ). |
| 4. Conveying air hose (output - <b>1.2</b> ).     | 8. Rinsing air hose (output - <b>1.4</b> ).       |

(The connection "B" on simpler plant layouts with automatic powder guns is not used, so a protective screw cap - Order No. 206 474 - must be fitted).

Figure 7

**b) Setting the powder flow rate**

In order to set the conveying, and supplementary air correctly on the PGC or OptiTronic control module and therefore the powder output, the amount of powder to be deposited must be determined first.

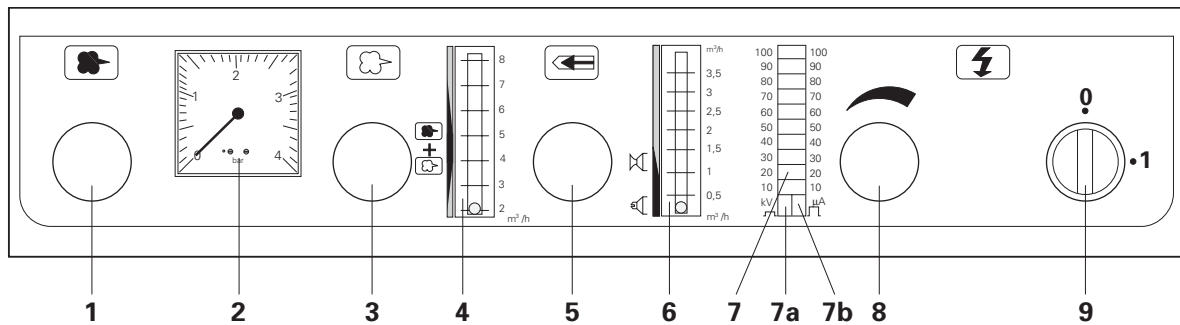
The conveying air pressure setting for the pressure gauge (2) is found in the table on page 8 through the desired amount of powder to be deposited, in grams per minute.

If the conveying air pressure is increased, through the control knob (1), then the powder output increases correspondingly. If the ball in the flowmeter (4) does not "float" in the green sector of the scale then the supplementary air must be adjusted either up or down, on the setting knob (3).

Should the conveying air be set to over 2,5 bar then the supplementary air is no longer required and the setting knob (3) can be turned completely to the left-hand stop.



**After every setting of the conveying air the ball in the flowmeter (4) must "float" in the green sector of the scale (4-5 m<sup>3</sup>/h).**



Front panel

- |  |  |
|--|--|
| 1. Control knob for conveying air gauge.               | 6. Flowmeter for rinsing air.              |
| 2. Conveying air gauge.                                | 7. High-voltage/corona current meter.      |
| 3. Control knob for supplementary air.                 | 7a. Gun <b>ON</b> and kV setting/ reading. |
| 4. Flowmeter for conveying air plus supplementary air. | 7b. Gun <b>ON</b> and μA setting/ reading. |
| 5. Control knob for rinsing air.                       | 8. HV/Corona current control knob‡.        |
|  | 9. Power switch.                           |

‡ The potentiometer knob is a push-pull combination type :  
 Pulled out = Corona current  
 Pushed in = High-voltage

Figure 8

Values in the table below are approximate and only serve as a guideline for the various settings as conditions in different workshops can vary greatly (see page 9).

Specification:	Powder hose:	ø 11 mm - 12 m. long.		
	Powder:	PES 31.9010 S		
	Constant volume of air:	4 m <sup>3</sup> /h (Conveying air + supplementary air).		
	<b>g/min.</b>	bar	<b>g/min.</b>	bar
	<b>25</b>	0.8	<b>175</b>	1.9
	<b>50</b>	1.0	<b>200</b>	2.1
	<b>75</b>	1.15	<b>225</b>	2.3
	<b>100</b>	1.35	<b>250</b>	2.5
	<b>125</b>	1.50	<b>275</b>	3.1
	<b>150</b>	1.7		

### c) Functional check

See trouble shooting guide on pages 21 and 22 for malfunctions.

1. The gun must be mounted in the booth and pointed towards a grounded workpiece, approximately 20 cm away. All connections must be made.
2. Depress the High-voltage control knob (**8** - Fig. 8, page 7) on the control module, if not already in this position, and turn to the left-hand stop.
3. Switch on the main switch (**9** - Fig. 8, page 7) of the control module. The PG 2-A is ready for operation as soon as either one of the vertical LEDs is selected.
4. The lowest left-hand LED (**7a** - Fig. 8, page 7) on the High-voltage/Corona current meter (**7** - Fig. 8, page 7) should illuminate when High-voltage is selected and the right-hand LED (**7b** - Fig. 8, page 7) should illuminate when Corona current is selected.
5. Set the pressure for the desired rate of powder deposit (in g/min, see the table above) on the conveying air pressure gauge (**2** - Fig. 8, page 7). The maximum output is 3,5 bar.
6. Check on the supplementary air flowmeter (**4** - Fig. 8, page 7) if the ball "floats" within the green sector of the scale. If it does not, turn the supplementary air control knob (**3** - Fig. 8, page 7) to the left or right, until the ball is positioned correctly.
7. Set the rinsing air by turning the rinsing air control knob (**5** - Fig. 8, page 7) until the ball in the rinsing air flow meter (**6** - Fig. 8, page 7) "floats" within the respective green sector of the scale depending on the type of jet nozzle being used (flat jet nozzle or round jet nozzle).

When all the above checks have been successfully completed, the gun is ready for use. If it fails to function correctly, consult the trouble shooting guide on pages 21 and 22.

## Start-up

### a) Adjusting the powder output and powder cloud

The powder output is dependent on the type of powder, the powder hose length and the number of coils, the powder hose diameter, the conveying air pressure, the accumulated powder on the inside wall of the powder hose, and the dosing air.

1. The gun must be mounted in the booth and pointed towards a grounded workpiece, approximately 20 cm away. All connections must be made.
2. Check powder fluidization visually.
3. Switch the control module on.
4. Set the conveying air (see page 8).
5. Adjust the supplementary air (see page 8).
6. Adjust the rinsing air pressure.

Using a flat jet nozzle

- Adjust the pressure gauge (**2** - Fig. 8, page 7) on the control module to the desired powder feed rate (see table on page 8).
- Adjust the supplementary air on the flowmeter (**4** - Fig. 8, page 7) so that the ball "floats" within the green sector on the scale.
- Adjust the rinsing air on the flowmeter (**6** - Fig. 8, page 7) so that the ball "floats" in the lower green sector on the scale.

Using a round nozzle with vented deflector

- Adjust the pressure gauge (**2** - Fig. 8, page 7) on the control module to the desired powder feed rate (see table on page 8).
- Adjust the supplementary air on the flow meter (**4** - Fig. 8, page 7) so that the ball "floats" within the green sector on the scale.
- Adjust the rinsing air on the flow meter (**6** - Fig. 8, page 7) so that the ball "floats" in the upper green sector on the scale.

7. Adjust the powder cloud orientation to suit the workpiece.

Using a flat jet nozzle

- Loosen the threaded sleeve.
- Turn the flat jet nozzle in the desired axial direction.
- Tighten the threaded sleeve.

Using a round nozzle with vented deflector

- Change the deflector (ø 16, 24, and 32 mm).



**IMPORTANT**

**Never turn the deflectors, these are pushed on an O-ring fitting!**

## b) Powder coating - Start-up

**⚠ CAUTION**

**First check that all electrostatically conductive parts within 5 m of the coating booth are grounded.**

1. Check the powder fluidization visually.
2. The gun must be mounted in the booth, but not pointed towards a grounded workpiece. All grounding connections must be made.
3. Switch on the PGC control module, the PG 2-A starts to spray powder.
4. Adjust the high-voltage:  
Check by observing the LEDs (**7** - Fig. 8, page 7 - Setting knob pushed in).
5. The workpiece(s) can now be coated.

## c) Shut-down

1. Switch off the PGC control module.  
The adjustment for High-voltage, rinsing air, and powder output must not be changed.
2. For work interruptions such as lunch breaks, over-night, etc. it is necessary to disconnect the compressed air supply.

## d) Rinsing the powder hose

Before long idle periods the residual powder must be removed from the powder hose as follows:

1. Pull off the hose from the injector.
2. Point the gun into the booth.
3. Blow out the hose manually with a compressed air gun or with the special ITW Gema Hose Cleaning Gun (Order No. **346 055**).
4. Refit the hose to the injector sleeve.

## Cleaning and repairs.

### PG 2-A Automatic powder gun

Conscientious maintenance at regular intervals increases the operating life of the coating equipment and will result in uniform coating quality over a longer period!

#### a) Cleaning



**Before cleaning the gun, switch off the PGC control unit. The compressed air used for cleaning should be free from oil and water.**

#### Daily:

1. Clean the outside of the gun.

#### Weekly:

2. Detach the powder hose connection (**32** - Fig. 13, page 15) at the powder hose connector (**10** - Fig. 10, page 12).
3. Detach the nozzle (**15** - Fig. 10, page 12) from the gun and clean it.
4. Blow out the gun through the powder inlet in the direction of flow.
5. Clean the powder tube (**10** - Fig. 10, page 12) with the spiral brush supplied.
6. Blow out the gun with compressed air again.
7. Clean the powder hose (**11** - Fig. 10, page 12).
8. Reassemble and reconnect the gun.



**Make sure that the threaded sleeve is always screwed tight. If the spray nozzle is loosely fitted there is a probability that High-Voltage can "flash over" and cause serious damage to the powder gun. Coating powder can also enter the Rinsing air channel with a loosely fitted threaded sleeve and this can also lead to serious damage.**

**All cavities are hermetically sealed. If the sealing rod is missing from the channel inside the shaft, coating powder can enter and interrupt the grounding of the SuperCorona. The channel can be cleaned after the screw (X- see Fig. 9 below) has been removed. The screw must be replaced afterwards, otherwise the grounding of the SuperCorona is not possible. There is also a similar screw in the PG 2-AX.**

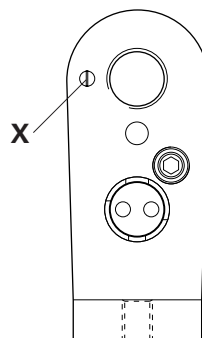


Figure 9

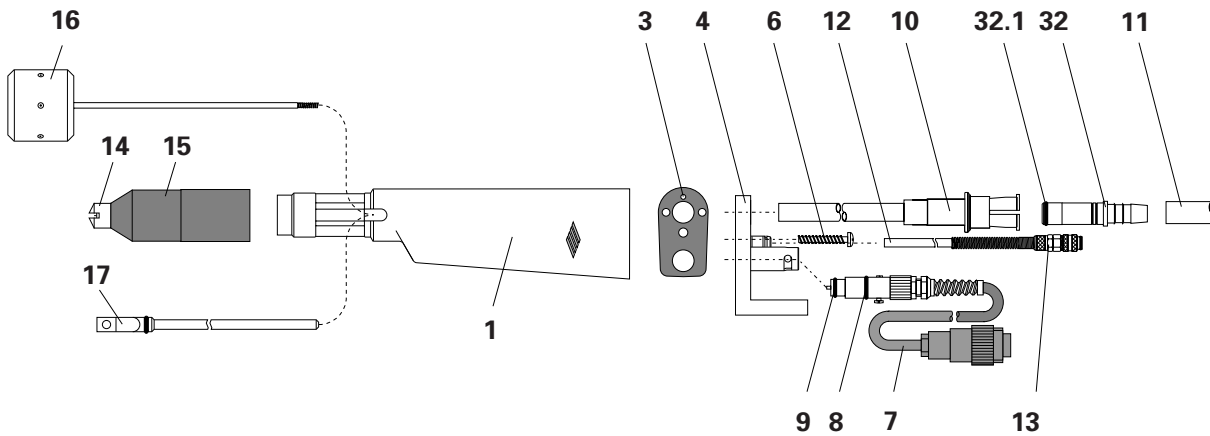
## b) Gun disassembly



The gun should only be disassembled if this becomes necessary due to a defect. Disassemble only to the point where access to the corresponding part is achieved.

Before cleaning the gun, switch off the control module.

The cascade (in the shaft - 1) must not be removed because it has been installed by a special process. If the cascade is defective, send the entire shaft to an authorized ITW Gema service centre.



- |   |                            |
|---|----------------------------|
| 1. Shaft (with High-Voltage cascade).       | 11. Powder hose.           |
| 3. Gasket.                                  | 12. Rinsing air hose.      |
| 4. Gun supporting bracket.                  | 13. Quick-release coupling |
| 6. "PT" Special screw.                      | 14. Flat Jet Nozzle.       |
| 7. Gun cable.                               | 15. Threaded sleeve.       |
| 8. O-Ring.                                  | 16. SuperCorona.           |
| 9. O-Ring.                                  | 17. Sealing rod.           |
| 10. Powder hose connection/<br>Powder tube. | 32. Powder hose connection |
|   | 32.1 O-Ring                |

Figure 10

### Gun disassembly (continued)

1. Detach the powder hose connection (**32** - Fig. 10, page 12) from the powder tube connection (**10** - Fig. 10, page 12).
2. Detach the rinsing air hose (**12** - Fig. 10, page 12) at the connection.
3. Remove the nozzle (**14** and **15** - Fig. 10, page 12).
4. Unscrew the powder tube (**10** - Fig. 10, page 12) completely and pull it out of the gun support bracket (**4** - Fig. 10, page 12).
5. Loosen the crosshead screw on the cable connector (**7** - Fig. 10, page 12) (**do not screw out completely**).
6. Give the cable connector (**7** - Fig. 10, page 12) a 1/4 turn counterclockwise and pull it out of the gun supporting bracket (**4** - Fig. 10, page 12).
7. Only unscrew the "PT" Special screw (**6** - Fig. 10, page 12) when the shaft must be returned for repair.
8. Clean the gasket (**3** - Fig. 10, page 12) or replace.

### c) Gun assembly

- The gun is reassembled in the reversed order.
- Careful handling is recommended.
- Fit the gasket (**3** - Fig. 10, page 12) into the recess in the rear of the shaft (**1** - Fig. 10, page 12). The gasket should fit comfortably.
- If the gun connector (**7** - Fig. 10, page 12) cannot be inserted properly without applying force, disassemble the gun again and reassemble it.

**IMPORTANT**

**Because the "PT" Special screw (6 - Fig. 10, page 12) is self-tapping, care must be taken that a "new" thread is not cut when reassembling the shaft (1 - Fig. 10, page 12) and gun supporting bracket (4 - Fig. 10, page 12).**

**Under no circumstances is a similar sheet metal screw to be used in place of the "PT" Special screw.**

After the gun has been reassembled check that:

- the gun connector (**7** - Fig. 10, page 12) is properly seated.
- there are no gaps between joints.

For functional reasons the channel for grounding the SuperCorona is further away from the powder tube axis than the electrode rinsing.

It can be seen with the naked eye that the distance **Y** (see below) is larger and this position belongs on the same side as the channel for the grounding of the SuperCorona. This is the same for the PG 2-AX, but the gasket is thinner.

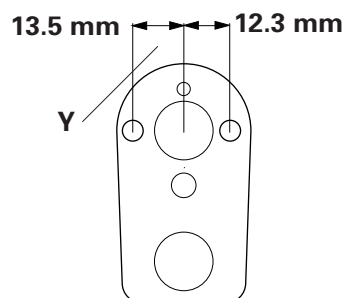


Figure 11

## d) Gun repair

Except for the replacement of defective parts, virtually no repairs should be required. The replacement of the cascade (In the shaft **1** - Fig. 10, page 12) and the repair of the cable connector (**7** - Fig. 10, page 12) should only be performed by an authorized ITW Gema service centre - please consult your ITW Gema dealer.

### Checking the gun connector

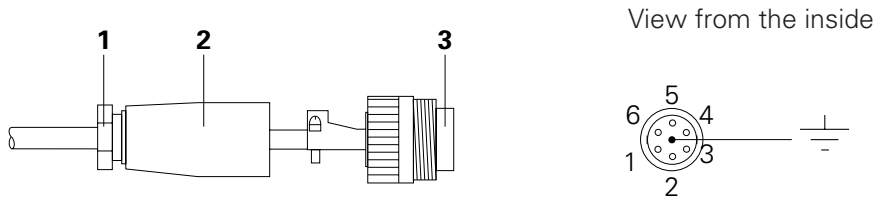


Figure 12

1. Opening the connector:

- Unfasten the sealing gland (**1**)
- Unscrew the sleeve (**2**)

In case the sleeve cannot be unscrewed, put the gun plug into the gun connection at the socket (**A Gun** - Fig. 7, page 6) and try again!

- 2. Unfasten the two screws of the cable clamp.
- 3. Check the wires of the connector (**3**) for electrical continuity.

Pin assignment:	1 - white wire	4 - bridged with pin 3
	2 - vacant	5 - vacant
	3 - bridged with pin 4	6 - brown wire
	centre - screening (ground)	

When one or more wires are broken the complete gun cable must be returned to an authorized ITW Gema Service Centre.

If there is no damage then the gun cable can be reassembled as follows :

- 7. Tighten the two screws of the cable clamp.
- 8. Screw on the sleeve (**2**) and tighten.
- 9. Tighten the sealing gland (**1**).

### Powder hose connection (See Fig. 13, page 15)

In principle a powder hose (**11**) can be fitted directly into the hose holder (**10**) and by pushing the clamp ring back to the stop is locked.

Loose tolerances on the powder hose (**11**) can cause powder to escape. It is, therefore, recommended to use the powder hose connection (**32**).

The hose connection (**32**) should be left in the powder hose (**11**) as long as the hose is in use.

When 2 sets of powder hoses are used, for example, double the number of hose connections (**32**) are required. When connecting the hose connection it should be observed that the O-Ring (**32.1**) is seated properly. The hose connection (**32**) should be pushed into the powder hose holder (**10**) until the shoulder sits against the stop and it should be observed that gripping rings snap into the grooves. One hose connection (**32**) per powder gun will be supplied. Additional hose connections are required for multiple colour coating equipment and must be ordered separately.

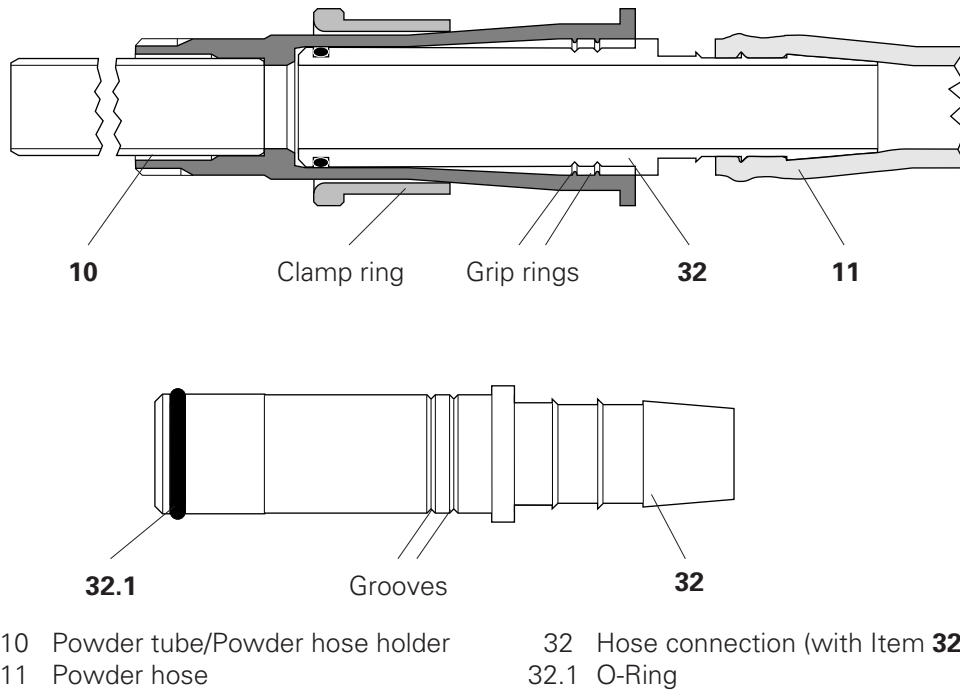


Figure 13

## Spray nozzles

### a) Cleaning

#### Daily or after each shift:

- Clean the outside of the spray nozzles with compressed air, solvents or any other liquids. **Never** immerse spray nozzles in solvents for any length of time.
- Check the seating of the spray nozzle.



**Make sure that the threaded sleeve is always tightened correctly. If the flat jet nozzle is loosely mounted, High-voltage from the gun can "flash-over" and damage the gun! Also, if the threaded sleeve is not screwed down tightly coating powder can enter the rinsing air channel and cause problems.**

#### Weekly:

- Remove the spray nozzle and clean the inside with compressed air. Sintered powder should be removed.

#### Monthly:

- Check the spray nozzle for wear.

Replace the flat jet nozzle if:

- the spray pattern is no longer a perfect oval.
- deep grooves are present in the nozzle slot, or if the wall thickness has decreased.
- the wedge at the rear of the electrode holder is worn.

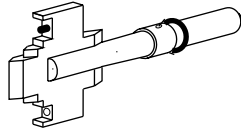
By nozzles with deflectors

- If the wedge at the rear of the electrode holder is worn, change the electrode holder.

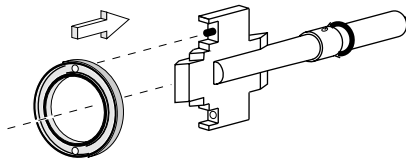
**Assembly - see page 16**

## Important notes for assembling the nozzles

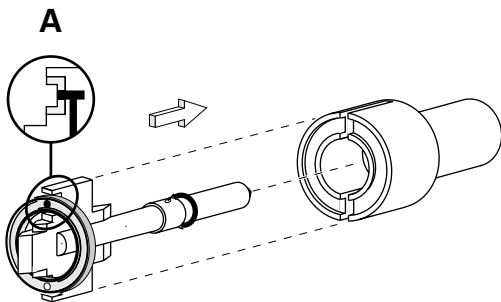
### Round jet nozzle



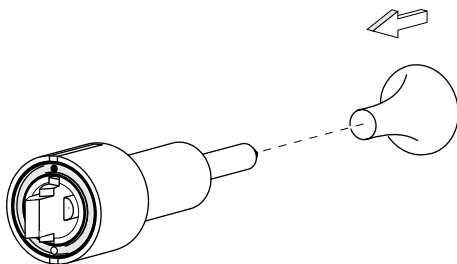
1. Hold the electrode holder.



2. Push the black contact ring with the hole on to the back of the electrode holder. **Attention! The slot in the contact ring must be visible from the rear - see Detail A !**



3. Push the electrode holder with the contact ring into the slot of the nozzle and press home.



4. Place the deflector onto the tip of the electrode holder and push it in as far as it will go, after the nozzle is fitted to the gun.

**Don't twist the deflector !**

### Flat jet nozzle :

Assembly of the Flat jet nozzle is the same as with the Round jet nozzle.

Figure 14

## SuperCorona® (Option)



Care should be taken as there is a slight risk of injury when fitting the SuperCorona ring due to sharp edges on the Corona electrodes.

### Assembly

1. Unscrew the threaded sleeve (15) from the gun shaft (1).
2. Remove the sealing rod (17) from the gun with a small screwdriver blade or similar and place in a safe place.
3. Place the SuperCorona contact rod in the slot into the gun and slide the SuperCorona ring (16) down over the nozzle to the stop.
4. Screw the threaded sleeve (15) onto the gun. The SuperCorona ring (16) is held firmly by the threaded sleeve.

### Disassembly



Do not turn the SuperCorona ring

1. Unscrew the threaded sleeve (15) from the gun (1).
2. Carefully pull the SuperCorona ring (16) with the grounding rod, off over the gun nozzle thread - Do not turn.
3. If necessary, fit the sealing rod (17).

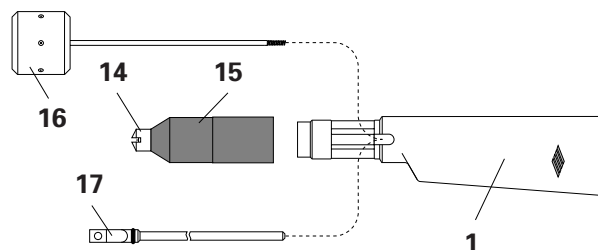


Figure 15

## Adapter for PG 1-A Automatic Powder Gun Connectors (Option)

When a PG 1-A gun is replaced by a PG 2-A gun the existing gun connector must not also be replaced. An adapter is available because the gun connectors for PG 1-A and PG 2-A have different lengths. The adapter fits onto the bayonet fitting of the gun so that the contact pins of the gun connector fit exactly on the contacts of the gun. The PG 1-A gun connector is locked in position with a cross-head screw.

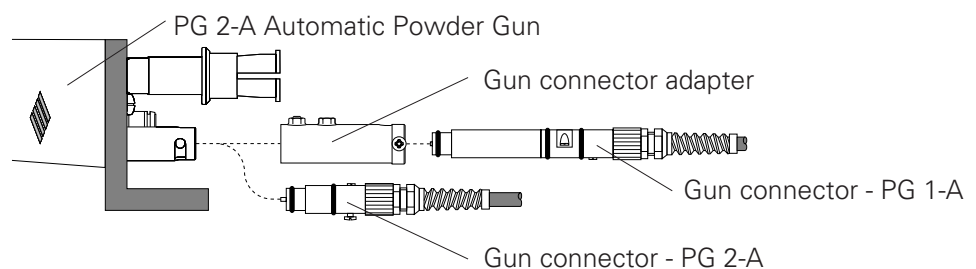


Figure 16

## PG 2-AX Automatic Powder Gun for Quick Colour Changes

### Removing the Powder tube

Generally, the powder tube (10) must not be removed. However, if the powder tube (10) must be removed, it can be unscrewed.

To reassemble the powder tube (10) a guide plug (24) is fitted into the tube. This will give a good lead-in for the tube.

For the longer versions (PG 2-AX 14/16) it can happen that when trying to unscrew the powder tube (10) it can clamp, when this happens, proceed as follows:

Place the ejector (25 - Fig. 18, page 19) in the opening **X** and push the powder tube back approximately 4-5 mm (the powder tube is flexible enough) then unscrew the tube. Be sure to use the special extractor (34 - Order No. 365 270).

The so-called Metallic Powder tube extends by about 150 mm out of the shaft at the position **X**. The powder tube (10) is loosened by turning it approximately 90° (clockwise) and then by turning it at position **X**. (Use a similar procedure on assembly also).

If this is not successful, try the following:

1. Remove the powder hose connection (32), gun cable (7), and rinsing air hose (12) from the gun.
2. Remove the gun from the holder and lay it on a clean table.
3. Unscrew the screws (22 - two screws, and 23) holding the supporting tube.
4. Fit the ejector (25 - Fig. 18, page 19) into the powder tube and push the powder tube back about 5 mm. The end piece (18) can be slid these 5 mm along the support tube (19).
5. Remove the powder tube (10).
6. Push the gun (1) and supporting tube (19) together and replace screws (22 - two screws) and then screw (23) to fix the supporting tube.
7. Screw in the new powder tube (10) fitted with the guide plug (24). Remove the guide plug (24) when the tube is in place.
8. Replace the gun in the holder on the reciprocator.
9. Fit the powder hose (11), gun cable (7), and rinsing air hose (12) on the gun.

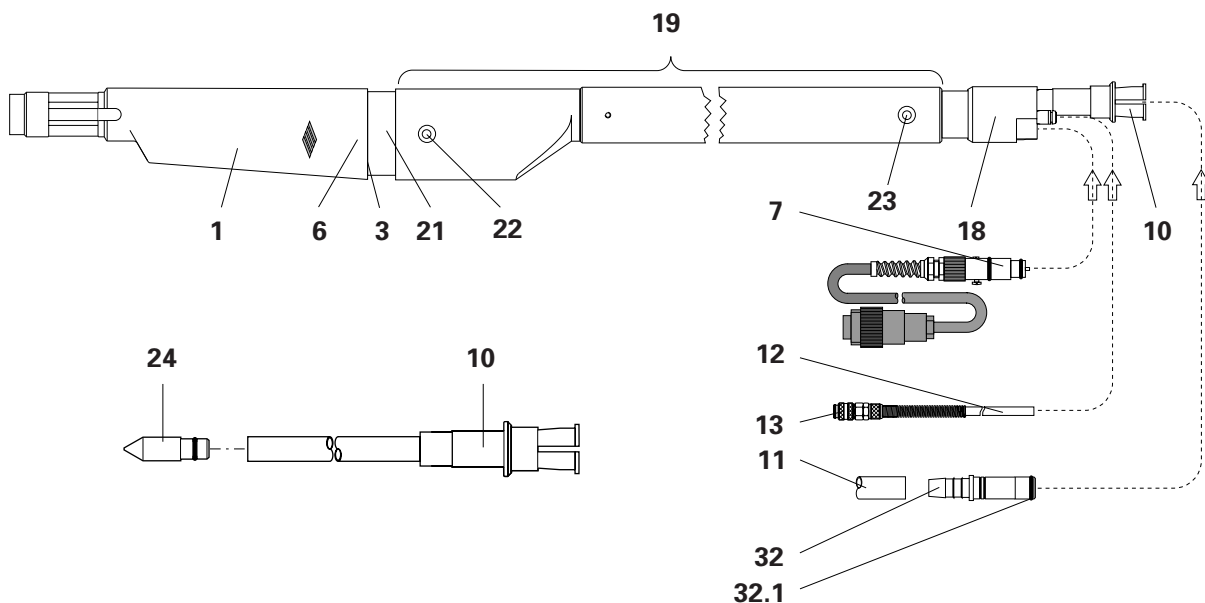


Figure 17

## Completely dismantling the Powder Gun

Proceed according to Removing the Powder tube, Steps 1-5, page 18.

6. Carefully pull out the shaft (1), at the same time push the end piece (18) in.
7. Loosen the cross-head screw (30). Do not remove.
8. Turn the gun plug (29) 90° in the counter-clockwise direction.
9. Grip the rinsing air hose (28) with a pair of pliers and push the ring on the pneumatic hose coupling (27) towards the gun and at the same time pull the rinsing air hose out of the pneumatic hose coupling.
10. When required the end piece (18) can be pulled out with the gun plug (29) and cable, and the rinsing air hose (28).
11. If the shaft (1) is defect, the "PT" Special screw (6) must be unscrewed. The intermediate block (21), the gasket (3), and the shaft (1) are accessible.



**If a part of the shaft (1) is broken or the high-voltage cascade in the shaft is defective, then the complete shaft must be returned to a ITW Gema service centre for inspection and/or repair. The High-voltage cascade is fitted according to a special process and therefore should not be dismantled by the user. The shaft assembly (with cascade), however, can be replaced as a spare part.**

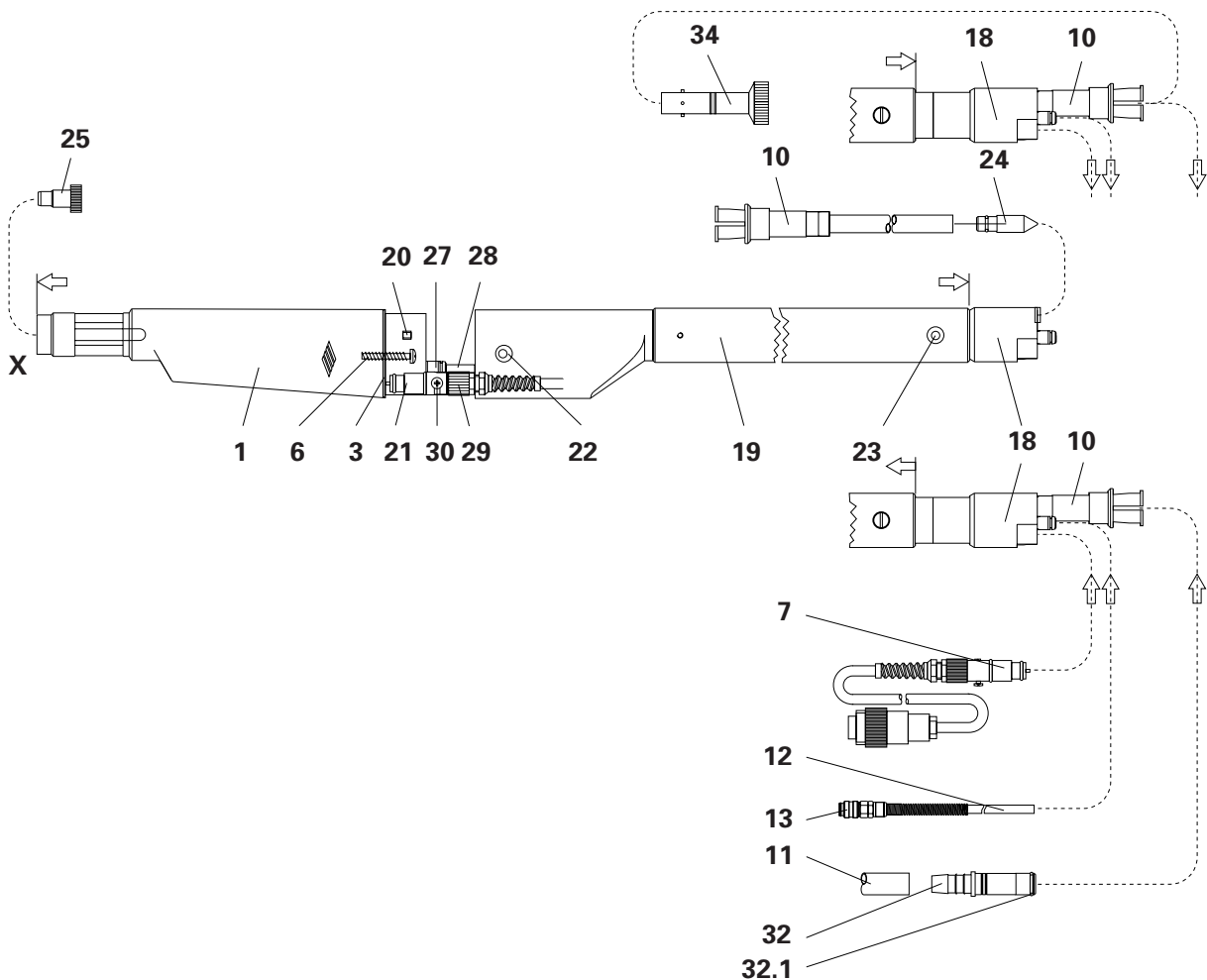


Figure 18

## Reassembly

1. Replace the 0.5 mm thick gasket (3). The thickness is important
2. Fit the gasket (3) into the recess in the shaft (1) so that it is held in the shaft end on the whole periphery.
3. Fit the intermediate block (21) and carefully screw in the "PT" Special screw (6) so that it does not cut a new thread.
4. Fit the end piece (18) with the connections into the supporting tube (19).
5. Connect the gun plug (29) and turn it 90° in the clockwise direction. Lightly tighten the cross-head screw (30).
6. Fit the rinsing air hose (28) into the pneumatic coupling (27).
7. Push the shaft (1) onto the extension of the supporting tube (19) and at the same time pull the end piece (18) carefully out (approximately 40 mm).
8. Screw in the two M6 x 16 mm plastic screws (22). The displacement of the M6 holes to the countersink is intentional. This causes the shaft (1) and the extension of the connecting tube (19) to be pressed against each other, with the result that there are no gaps for powder to penetrate into the gun.
9. Position the end piece (18) and screw in the M4 x 6 mm plastic screw (19).
10. Screw in the powder tube (10) - as in Removing the powder tube, step 7, page 18.
11. The gun is now ready to be mounted on the reciprocator.

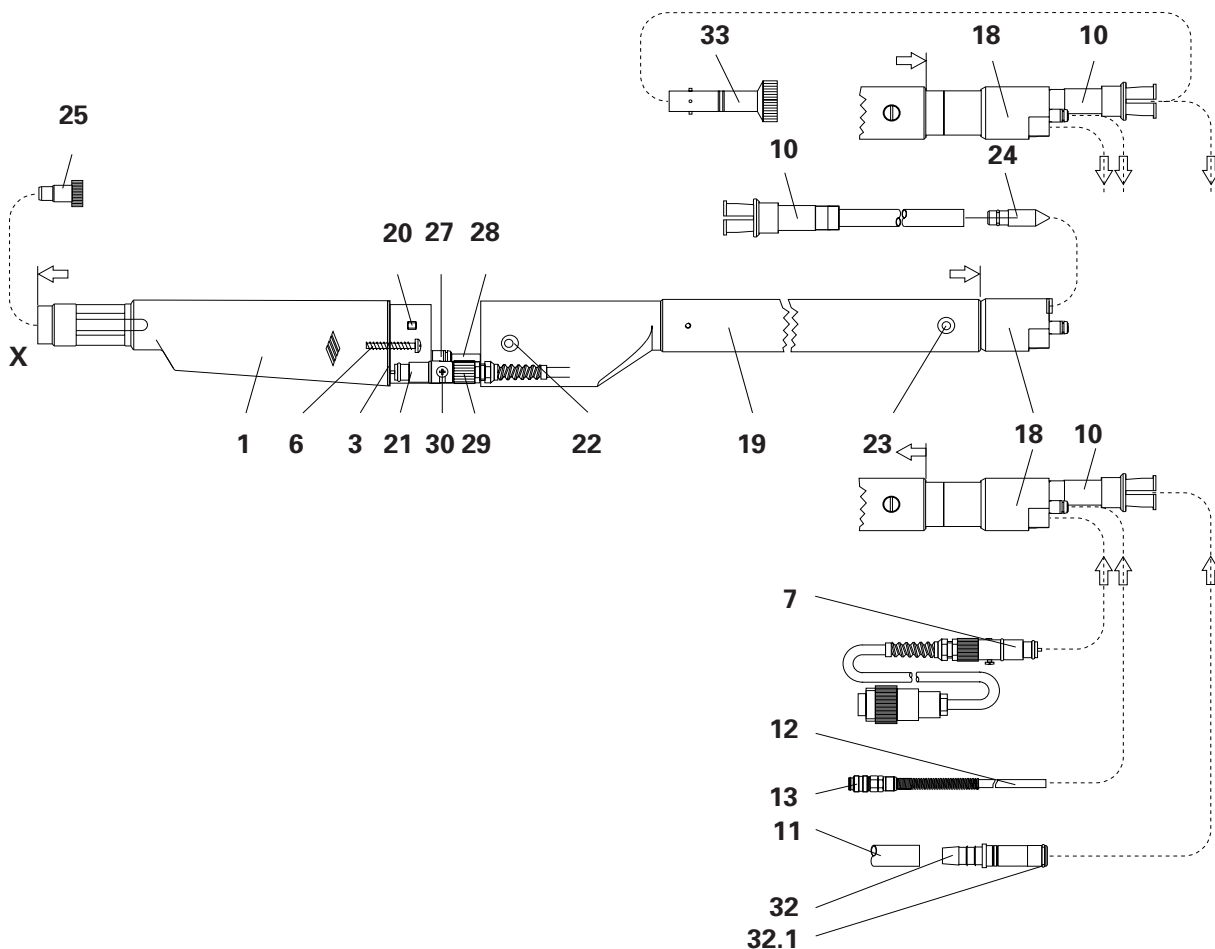


Figure 18a

## Trouble shooting guide

(Bold numbers in the text refer to Fig. 10, page 12)

Faults	Causes	Remedies
Lamp does not illuminate although control unit has been switched on.	<p>No power:</p> <ul style="list-style-type: none"> <li>- Control unit is not connected to Mains</li> <li>- Fuse F1 (PGC or OptiTronic) defective</li> <li>- External fuse defective</li> </ul> <p>In equipment:</p> <ul style="list-style-type: none"> <li>- Lamp defective</li> <li>- Printed circuit board (PGC or OptiTronic) defective</li> </ul>	<p>Connect sprayer with power cord to Mains</p> <p>Replace</p> <p>Replace or reset</p> <p>Replace</p> <p>Mail in for repair</p>
Needle of pressure gauge for conveying air stays at zero when making adjustments	<ul style="list-style-type: none"> <li>- Booth air not operating</li> <li>- No compressed air</li> </ul> <p>In equipment:</p> <ul style="list-style-type: none"> <li>- Solenoid valve defective</li> <li>- Printed circuit board (PGC or OptiTronic) defective</li> </ul>	<p>Switch on Booth air</p> <p>Switch on compressed air</p> <p>Replace</p> <p>Mail in for repair</p>
Gun does not spray powder although the PGC or OptiTronic control module is switched on, the lamp is illuminated and compressed air is also present.	<ul style="list-style-type: none"> <li>- Injector, check valve or throttling at injector, powder hose or gun clogged</li> <li>- Insert sleeve in injector is worn</li> <li>- Fluidization does not function</li> </ul> <p>No conveying air:</p> <ul style="list-style-type: none"> <li>- Reducing valve in the PGC or OptiTronic control module defective</li> <li>- Solenoid valve in PGC or OptiTronic control module defective</li> <li>- Printed circuit board (PGC or OptiTronic) defective</li> </ul>	<p>Replace or clean the corresponding part</p> <p>Replace</p> <p>See PGC or OptiTronic control module, PH Powder container or ADU Air Distribution Unit operating instructions</p> <p>Replace</p> <p>Replace</p> <p>Mail in for repair</p>

(continued)

## Trouble shooting guide (continued)

((Bold numbers in the text refer to Fig. 10, page 12)

Faults	Causes	Remedies
Gun sprays powder but does not adhere to the workpiece.	<ul style="list-style-type: none"> <li>- Too low or no high-voltage</li> <li>- Gun connector, gun cable or gun cable connector (<b>7</b>) is defective.</li> <li>- High-voltage cascade is defective.</li> <li>- Printed circuit board (PGC or OptiTronic) defective.</li> </ul>	<p>Increase high-voltage in PGC control module</p> <p>Replace the gun cable(<b>7</b>) and test on another PGC or OptiTronic control module</p> <p>Mail in the Shaft (<b>1</b>) for repair.</p> <p>Mail in for repair.</p>
Gun sprays powder, high-voltage is present but does not adhere to the workpiece.	<ul style="list-style-type: none"> <li>- Workpiece not properly grounded.</li> </ul>	<p>Check the ground connection, also refer to "Safety rules".</p>
Conveying air cannot be adjusted.	<ul style="list-style-type: none"> <li>- Control knob turns freely on the shaft or the grubscrew is loose.</li> </ul>	<p>Tighten the grub-screw.</p>

## Spare Parts List

### Ordering Spare Parts

When ordering spare parts for powder coating equipment, please indicate the following specifications:

1. Type, and serial number of your automatic powder coating equipment
2. Order number, quantity, and description of each spare part.

Example:

1. **Type** PG 2-A, **Serial no:** xxxx xxxx
2. **Order no:** 232 564, 2 pieces, O-ring gaskets

When ordering cable or hose material the length required must also be given. The spare part number of yard/metre ware always begins with 1.. ... and are always marked with an \* in the spare parts list.

Wear parts are always marked with a #.

All dimensions of plastic powder hoses are quoted as external (o/d), and internal (i/d) diameters:

e.g.  $\varnothing$  8 / 6 mm = 8 mm outside diameter (o/d) / 6 mm inside diameter (i/d).

## PG 2-A Automatic powder gun

### Notes:

- a. Only those parts have been included in the spare parts list that can be replaced by the user without difficulty.
- b. If a part of the shaft (1) is broken or the High-voltage cascade in the shaft is defective, then the complete shaft must be returned to a ITW Gema service centre for inspection and/or repair. The High-voltage cascade is fitted according to a special process and therefore should not be dismantled by the user.  
The shaft assembly (with cascade), however, can be replaced as a spare part.
- c. If the gun cable (7) is defective, the complete gun cable assembly should be returned for repair.

Gun complete (without Items <b>11, 12, 16</b> )	
- Powder tube <b>above</b> (Polarity -)	361 690
- Powder tube <b>above</b> (Polarity +)	361 704
- Powder tube <b>below</b> (Polarity -) (Option)	361 674
- Powder tube <b>below</b> (Polarity +) (Option)	361 682
Gun Body (Items <b>1, 3, 4, 6, 10, 17</b> )	
- Powder tube <b>above</b> (Polarity -) (Option)	361 399
- Powder tube <b>above</b> (Polarity +) (Option)	361 402
Gun Body (Items <b>1, 3, 5, 6, 10, 17</b> )	
- Powder tube <b>below</b> (Polarity -) (Option)	360 899
- Powder tube <b>below</b> (Polarity +) (Option)	360 902
1 Shaft complete (with Item <b>17</b> )	
- Polarity -	361 534
- Polarity +	361 542
3 Gasket - 1.5 mm	360 236
4 Gun supporting bracket complete - Powder tube <b>above</b>	361 496
5 Gun supporting bracket complete - Powder tube <b>below</b> (Option)	361 488
6 "PT" Special screw	248 827
7 Gun cable (20 m) complete - for PG 2-A (with Items <b>8</b> and <b>9</b> )	360 600
8 O-Ring - ø 10.82 x 1.78 mm - Nitril	232 556
9 O-Ring - ø 7.65 x 1.78 mm - Nitril	232 564
10 Powder tube complete with quick-change release for ø 16 / 11 mm Powder hose	361 453
11 Powder hose - ø 16 / 11 mm	103 012#*
12 Rinsing air hose - ø 6 / 4 mm	103 144*
13 Quick-release coupling - ø 6 / 4 mm	200 840
14 Flat Jet Nozzle Set - Vented	319 350#
15 Threaded sleeve	328 774
16 SuperCorona complete	360 414#
17 Sealing rod - complete	361 526
17.1 O-ring - ø 3.5 x 0.9 mm - Nitril	232 432
26 Spiral brush for PG 2-A (not shown)	300 039

# Wear parts

\* Please indicate length required

(continued)

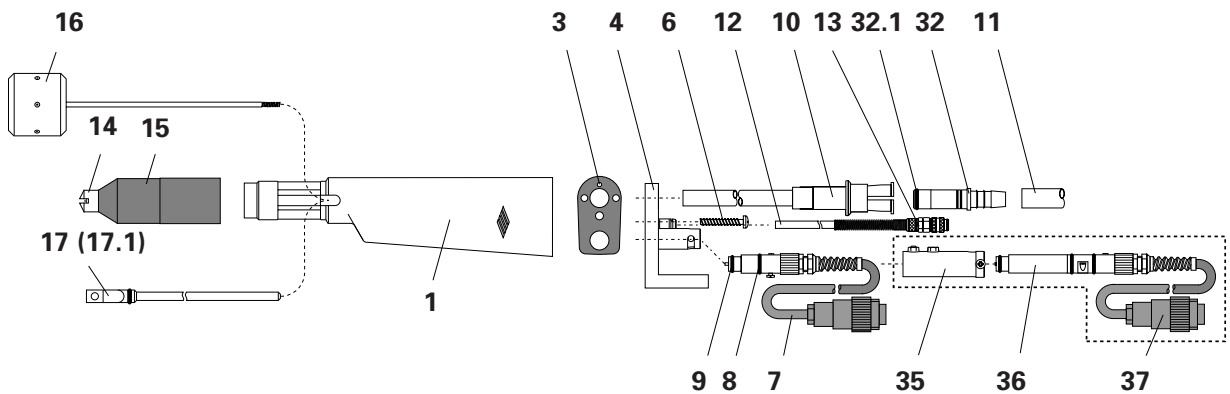
**PG 2-A Automatic powder gun**

(cont.)

32	Powder hose connection - complete	362 670
32.1	O-Ring - $\varnothing$ 13.1 x 1.6 mm - Nitril	232 670#
33	Small parts set (not shown)	
34	Extractor (not shown)	365 270
35	Adapter - PG 1-A Gun connector/PG 2-A	362 824 $\diamond$
36	PG 1-A Gun connector - from existing PG 1-A gun $\diamond$	
37	7 pin plug (for PG 1-A Gun connector) - from existing PG 1-A gun $\diamond$	

$\diamond$  Item **35** is only required if Items **36 / 37** are to be used with **PG 2-A** Automatic Powder Guns

**Powder Tube - Above - STANDARD**



**Powder Tube - Below - OPTION**

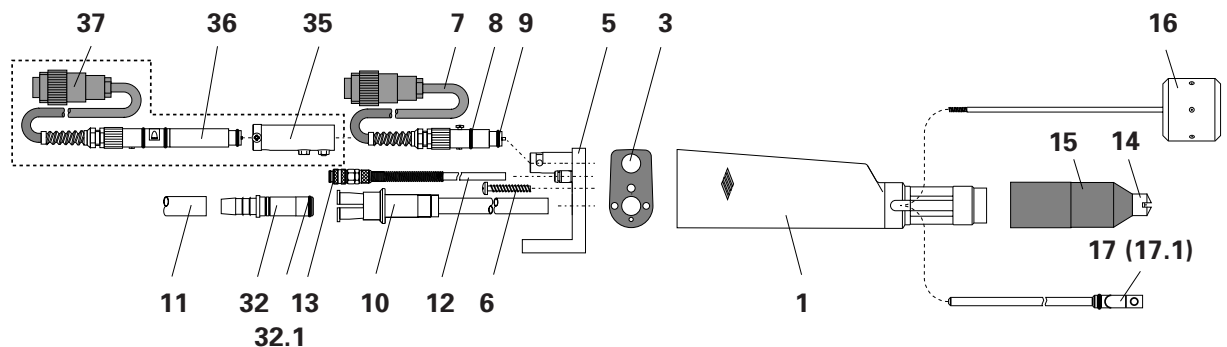


Figure 19

## PG 2-AX Automatic Powder Gun for Quick colour changes

Gun complete (without Items <b>24, 25</b> ) Polarity –			
L1	Nominal length L (mm)	Description	
260	650	PG 2-AX 06	361 925
460	850	PG 2-AX 08	361 933
660	1050	PG 2-AX 10	361 941
860	1250	PG 2-AX 12	361 950
1060	1450	PG 2-AX 14	361 968
1260	1650	PG 2-AX 16	361 976
1	Shaft complete (with Item <b>17</b> ) Polarity –		361 534
3	Gasket - 0.5 mm (not shown)		361 801
6	"PT" Special screw (not shown)		248 827
7	Gun cable (20 m) - complete (with Items <b>8</b> and <b>9</b> )		360 600
8	O-Ring - $\varnothing$ 10.82 x 1.78 mm - Nitril		232 556#
9	O-Ring - $\varnothing$ 7.65 x 1.78 mm - Nitril		232 564#
10	Powder tube complete with quick-change connector for $\varnothing$ 16 / 11 mm Powder hose		
	Nominal length L (mm)	Description	
	650	PG 2-AX 06	361 070
	850	PG 2-AX 08	361 089
	1050	PG 2-AX 10	361 097
	1250	PG 2-AX 12	361 100
	1450	PG 2-AX 14	361 119
	1650	PG 2-AX 16	361 127
11	Powder hose - $\varnothing$ 16 / 11 mm		103 012*
12	Rinsing air hose - $\varnothing$ 6 / 4 mm		103 144*
13	Quick-release coupling - $\varnothing$ 6 / 4 mm		200 840
14	Flat Jet Nozzle Set (40 mm)		319 350#
15	Threaded sleeve		328 774
16	SuperCorona - complete		360 414#
17	Sealing rod - complete		361 526
17.1	O-Ring - $\varnothing$ 3.5 x 0.9 mm - Nitril		232 432#
18	Endpiece complete with internal connections.		
	L1	Nominal length L (mm)	Description
	260	650	PG 2-AX 06
	460	850	PG 2-AX 08
	660	1050	PG 2-AX 10
	860	1250	PG 2-AX 12
	1060	1450	PG 2-AX 14
	1260	1650	PG 2-AX 16

# Wear part

\* Please indicate length required

(continued)

**PG 2-AX Automatic Powder Gun for Quick Colour Changes**

(cont.)

Item No.	Description	Nominal length L (mm)	Description	Part No.
19	Supporting tube - complete			
		650	PG 2-AX 06	360 228
		850	PG 2-AX 08	361 062
		1050	PG 2-AX 10	361 054
		1250	PG 2-AX 12	361 135
		1450	PG 2-AX 14	361 240
		1650	PG 2-AX 16	361 259
20	Plastic screw - M4 x 6 mm for SuperCorona channel (not shown)			<b>230 499</b>
21	Intermediate block complete (not shown)			360 783
22	C/sk screw - M6 x 16 mm			259 497
23	C/sk screw - M4 x 6 mm			214 639
24	Guide plug (not shown - see page 18)			362 026
25	Tube ejector (not shown - see pages 19/20)			340 839
32	Powder hose connection - complete			362 670
32.1	O-Ring - $\varnothing$ 13.1 x 1.6 mm - Nitril			232 670#
34	Extractor (not shown - see pages 19/20)			365 270
36	PG 1-A Gun connector - from existing PG 1-A gun $\diamond$			... ..
37	7 pin plug (for PG 1-A Gun connector) - from existing PG 1-A gun $\diamond$			200 085
38	Adapter (PG 1-A Gun connector/PG 2-AX)			363 596 $\diamond$



$\diamond$  Item **38** is only required if Items **36 / 37** are to be used with **PG 2-AX** Automatic Powder Guns

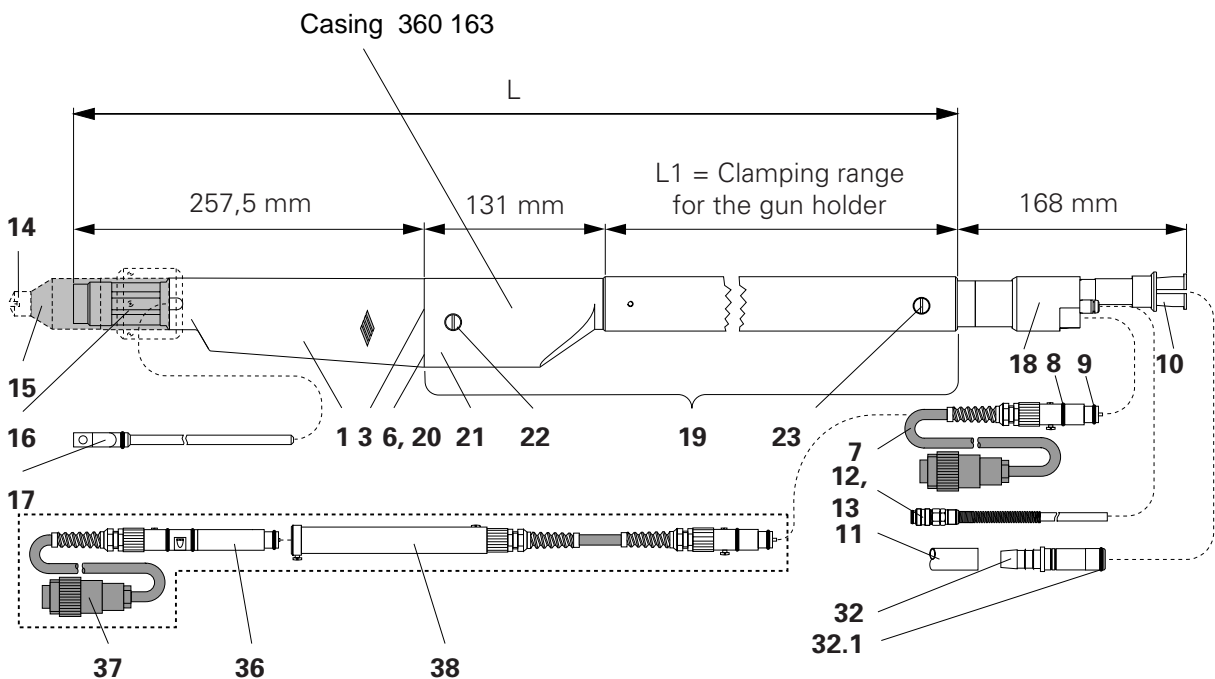
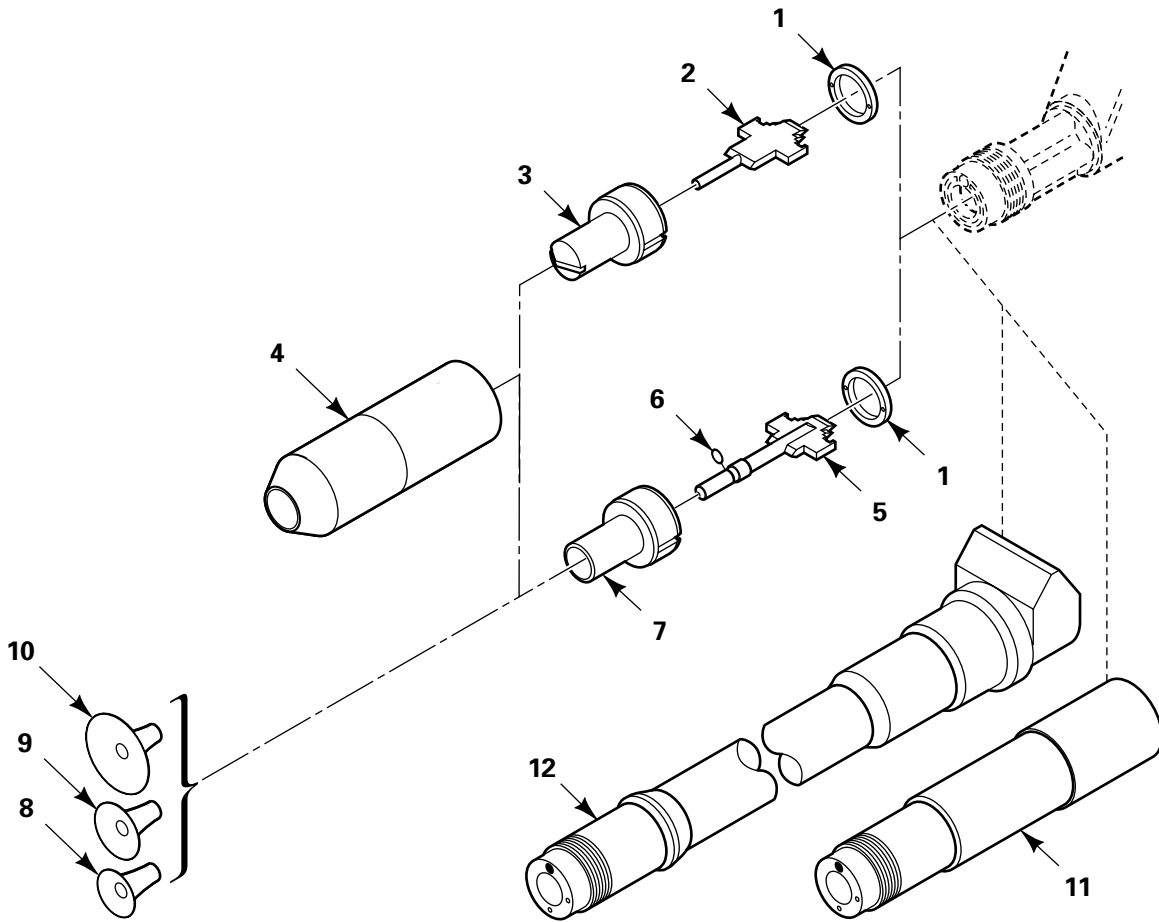


Figure 20

**Nozzle combination for PG 2-A /PG 2-AX Automatic Powder Guns**



	Flat Jet Nozzle Set (items <b>1, 2, 3</b> )	319 350
	Round Jet Nozzle Set (items <b>1, 5, 6, 7</b> )	347 337
1	Contact ring	318 760
2	Electrode holder - complete (Flat Jet Nozzle)	318 779#
3	Flat Jet Nozzle	318 744#
4	Threaded sleeve	328 774
5	Electrode holder - complete (Round Jet Nozzle)	347 329#
6	O-Ring - $\varnothing$ 5 x 1 mm	231 606#
7	Round Jet Nozzle	331 287#
8	Deflector - $\varnothing$ 16 mm	331 341#
9	Deflector - $\varnothing$ 24 mm	331 333#
10	Deflector - $\varnothing$ 32 mm	331 325#
11	Extention tube - 150 mm	347 310#
12	Extention tube - 300 mm	353 310#

**Notes:**

Documentation PG 2-A(X) Automatic powder gun

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